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Characteristics of the change process are described and the importance of improving understanding of the process of change is indicated. A summary of some relevant literature on the diffusion of innovation draws from studies in rural sociology, cultural anthropology, industry, education, and psychology. In addition, two premodels of change are outlined in an attempt to conceptualize or schematize the process. The premodels or paradigms are intended to have some utility to practitioners and to suggest to scholars the large gaps in knowledge that must be filled before a theory of change can be formulated. (HW)

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The Process of Effecting Change

by

William A. McClelland

Presidential Address
Division of Military Psychology
of the American Psychological Association
San Francisco, California September 1968

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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Prefatory Note

This paper was the Presidential Address presented to the Division of Military Psychology, Division 19, of the American Psychological Association, at the annual convention in San Francisco, California, September 1968. Dr. McClelland is Associate Director of the Human Resources Research Office.

THE PROCESS OF EFFECTING CHANGE

William A. McClelland

Introduction

Change. Let me begin my examination of the process of effecting change by offering a few aphorisms and a few quotations from respectable bits of prose.

"The more things change, the more they remain the same."

". . . and this, too, shall pass away."

"Most of the change we think we see in life
Is due to truths being in and out of favor." -- Robert Frost

"It is true that what is settled by custom though it be not good yet at least it is fit. And those things which have long gone together are as it were confederate with themselves; whereas new things though they help by their utility, yet they trouble by their inconformity. Besides they are like strangers, more admired and less favored." -- Sir Francis Bacon

The truth of Bacon's prose is apparent to us all, that is, to all of us who are concerned about the utilization of our research results.

In selecting my topic I believe I am applying, at least in part, Dick Trumbull's concept of relevance so eloquently elaborated in his Presidential Address to this Division two years ago (1). The military departments, Trumbull stated, have "a need to know which includes every facet of human existence and performance both at home and in other cultures." It is my contention that not only have we as psychologists a need to know the facts about the human condition, but we have also a great need to know how to use this information to improve human effectiveness (2).

Not all of the psychologists in Division 19 are, or should be, concerned with applications. Yet the current emphasis in Federal Government research and development (R&D) programs is very strong on demonstrations of the utility of our science *today*. Many of us are strongly encouraged to undertake research and studies that will make a difference in the real world, the kind of research that will make a difference relatively soon in how we go about solving problems in education in our cities, in the environment in which we live, and in the defense of our country. Some of us, at least, must be concerned with the process of effecting change.

Will the findings of research be put to use? Will knowledge be utilized? The historical record is not a bright one. Travers (3)

recites a too long litany of how little and how slowly psychological and educational research has influenced educational practice. Carter (4, 5) has added to the list of examples. Mackie and Christiansen (6) conclude their study of the U.S. Navy's applications from learning research findings thus:

> "It was found that the research-to-application process never has been properly developed for the psychology of learning. Consequently, there have been far fewer applications and much less impact on the educational process than might reasonably be expected in view of the size of the learning research effort. The reasons are believed traceable in large part to the research philosophies of experimental psychologists. But it was evident, also, that potential users have been reluctant to make the effort necessary to realize the benefits of research findings."

For 21 years I have been involved in research and development in military psychology. For all this time my concern has been with studies that would make a difference, that is, with applied R&D. My time with the Human Resources Research Office is especially relevant, since HumRRO has always been oriented toward the conduct of R&D that would contribute the solution of an Army training or operational problem. We have been concerned with utilization and perhaps even more concerned when utilization has not occurred. We live with and are concerned with the process of effecting change, primarily as a practical strategy.

Examination of the literature on change and innovation quickly shows that many disciplines, many professions, and many public and private agencies are vitally concerned with this topic. Aspects of change have been studied by rural sociologists, cultural anthropologists, psychiatrists, communications specialists, management and industrial engineers, educators, and all manner of psychologists. The U.S. Department of Agriculture, the U.S. Office of Education, the Agency for International Development, the Defense Department, the State Department, state and local government departments and agencies, private foundations and multitudinous facets of business and industry are all very much interested in the process of change. I believe the word "innovation" enjoys as great popularity today as did the word "systems" 10 years ago!

But what do we know about change? Why are some innovations adopted while others are not? How does one *really* move from research to development to application and use? What accounts for the differential successes of individual change agents and applied R&D organizations? How can an innovation once implanted be sustained?

This is the topic of my presentation: The Process of Effecting Change. I will review with you some of the salient characteristics of the change process and then present two pre-models of change in an attempt to conceptualize or schematize the process.

Background and Definitions

Cultural anthropologists have been interested in the change process perhaps longer than any other discipline (7, 8). A few educators were

examining the rates of diffusion of new ideas 30 years ago. Rural sociologists, who have had a continuing interest in innovation research since the 1920s, pioneered in the quantitative study of the diffusion process. Since World War II, a variety of people working in industry, economists, historians, engineers, and psychologists, have actively pursued studies in the area.

In recent years there have been a growing number of case studies from which testable hypotheses are emerging. To cite a few, there are Hood's fine study of the development and use of an Army leadership preparation training course (9), the O'Connell (10) and Burns and Stalker (11) case studies of planned changes in industrial settings, Niehoff's excellent examination of innovation in agrarian societies (12), Lippitt's provocative work in school systems (13), Richland's careful research on the traveling seminar and conference for school administrators (14), Morison's classic study of innovation in naval gunnery (15), R.J. Foster's handbook of examples of cross-cultural problems encountered by Americans working overseas (16), and the several other illustrations in Bennis, Benne, and Chin's *The Planning of Change* (17) and Miles' *Innovation in Education* (18).

Before the 1950s there was little or no convergence of the approaches undertaken by the disparate formal disciplines (19, 8). But, today, no conference or volume of essays on innovation is quite complete without cross-disciplinary representation (20, 21, 22, 23). While the individual scientists and practitioners may not yet speak each other's language with confidence or use one another's concepts freely, nevertheless, diffusion researchers seem to understand one another. And, the literature has grown from the mere handful of studies completed prior to 1940 to over 1100 by 1967 (24, 25).

Before proceeding, let me define a few of the terms I have been using and will continue to use:

> Innovation - a deliberate, novel, or specific change which is thought to be efficacious in accomplishing the goals of a system (26). (I have no intention whatsoever of defining a system.)
>
> Change Agent - a professional person who attempts to influence adoption decisions in a direction he thinks is desirable (8).
>
> Diffusion - the acceptance over time of some specific item (idea or practice) by individuals or groups or other adopting units linked by specific channels of communication to a social structure and to a given system of values or culture (27).

A final background note may add perspective. Studies of adoption rates may provide a normative note of cheer to military psychologists concerned with utilization of research and development. In education, the classic studies of Mort and Cornell (cited by Rogers, 8) published in 1941, indicated that it took about 50 years for complete diffusion of such practical inventions as the kindergarten to take place. More than 15 years elapsed before 3% of the nation's schools adopted change. Travers (3) reports the same kind of lag at the turn of the century in

the adoption of ideas proposed by Rice, a physician turned educator. Miles, however, feels diffusion has been much more rapid in the 1960s than it was in the 1930s (22).

In agriculture, individual farmers took about 15 years to adopt a new hybrid corn (28). Findings from Project HINDSIGHT (29) and from an Air Force Office of Scientific Research study (30) suggest that a 5 to 10 year period is typical of the lag in the use of a scientific or technological finding or event.

A study of adoption (i.e., prescription) of a new drug by physicians indicated that two years were needed for more or less complete diffusion (28). While HumRRO experience with Army utilization of R&D has not been studied formally, the range of time from completion of research to implementation of resulting product or use of the information has ranged from a few weeks to over 10 years.

Studies of diffusion rates have led several scholars, of whom Lionberger (31) is an example, to propose an S-shaped curve as descriptive of the relationship between numbers or breadth of adoption and time.

Clearly, adoption rates have varied over time, among contexts, and from discipline to discipline. The safest generalization, that is, "Diffusion takes time," is not very helpful. A great number of different variables must be examined, and it is to such a summary examination I now turn.

What Do We Know About Change?

What do we know about change? What can psychology, especially those psychologists engaged in R&D for the Defense Department, learn from change studies conducted by anthropologists, educators, engineers, and sociologists? At a minimum, we may find some of the concepts, tools, and procedures worthy of further study, test, and application.

1. Types of Change

Students of the change process speak of three types of change: imitation, selective contact change, and directed contact change (25). My concern, however, is with directed contact change or planned change, that is, a deliberate and collaborative process involving an agent of change and a client system. Change can come solely from within the system (32), but the contemporary national and international scene is clearly preoccupied with directed or planned change.

Our knowledge of planned change is a blend of experience and intuition, with a large dash of folklore, to which there is slowly being added a body of scientific literature. Most diffusion research is not hard science; it clearly belongs in the domain of social science, for innovation of any kind is a social-behavioral phenomenon.

The process of change as *practiced* is still pretty much of an art form. Nevertheless, in comparison with our knowledge 25 years ago, "Today . . . we understand a great deal more about the way in which new ideas diffuse among such varied audiences as physicians, Columbian

peasants, suburban housewives, industrial plant managers, and Australian aborigines" (25). Still, a number of simple, unlikely propositions about planned change have evolved on which comment is necessary.

Proposition #1: *A good product will succeed on its own merits*, or, stated differently, "Information is sufficient for change." A solid research report that contains clear action implications is all that is needed. It will convince the client system of the wisdom of adopting the stated or implied action.

Don't you believe it! No more picturesque case history evidence for this fallacy exists than the following quotation from Morison (15) concerning the effects of certain reports submitted a half century ago to the U.S. Navy Bureau of Ordnance and Bureau of Navigation on a new technique of naval gunnery.

> "The reports were simply filed away and forgotten. Some indeed, it was later discovered to ". . . [their author's] . . ." delight, were half eaten away by cockroaches."

There are several pessimistic signs on the contemporary national scene based on the workings of sophisticated information dissemination processes. Carter (5) summarizes the conclusions of a study of the NASA dissemination program to the effect that few, if any, commercial firms are vigorously seeking directly to use the technical and scientific output of NASA or the other advanced technology developments supported by the government. Nelson (33) doubts that there is as much direct transferability of the results of military R&D to civilian design as might be believed. The most acid comment, however, is probably Havelock's (34):

> "The technology information program undertaken by the National Aeronautics and Space Administration has been very well financed and elegantly organized, but, so far, evaluation studies [note: there have been at least three] lead to one conclusion: pitiful. In Medicine, the government has been less ambitious so far, but the funds expended on such projects as the National Library of Medicine's automated information retrieval system (MEDLARS) have not been clearly justified."

Proposition #2: *The introduction of an innovation is a final act, and no further attention is required.* Obviously, a plan for maintenance and feedback *is* essential if the planned change is to persist. Training aids and devices are today gathering dust in storerooms throughout the country. Teachers and managers have reverted to their former practices. The reappearance of old individual and organizational patterns of behavior testify to the reality of regression from innovative change. Speaking metaphorically, money, time, and continuous effort are required if the flowers and shrubs planted in America's beautification program are to survive.

Proposition #3: *There is an orderly process from research to development to use.* First the scientist discovers and then verifies a fact or a principle about natural phenemona, perhaps defining the relationship among a set of variables. Then the technologist develops

ways to use this information in order to get things done. Finally, the development is put to use. So goes the proposition.

But we know there is a great deal of crossing back and forth among research, development, and use (4, 35, 30, 29), despite the fact that there is all too little of this movement (6, 3).

2. Elements in a Diffusion of Innovation

Rogers (8) has identified four key elements in diffusion which bear scrutiny, namely, the innovation itself, communication, the social system, and time. A brief look at each may help to provide structure for understanding the process of effecting change.

The nature of the innovation will be discussed more fully in the next section ("Factors Inhibiting or Accelerating Change"). Communication is defined by Rogers as the transfer of ideas from source to receiver (25). Some innovations are more visible than others and therefore diffuse more rapidly. For example, which rat poison will diffuse more rapidly, one which kills rats in their holes, or one with the same lethality which kills them in the open?

A third key element in diffusion is the social system that is a "group of individuals (or units) who are functionally differentiated and engaged in collective problem solving around a common goal or output" (25). (Translation for military psychologists: A submarine or an air defense crew, an infantry squad, a station hospital, or the staff of a weapon system project office, are all examples of social systems.) As all good students of social psychology or engineering psychology are well aware (and sometimes, *painfully* aware), each social system may have a different set of norms and different role expectations of its members. And it is the members of the system individually and/or collectively who make decisions to accept or reject a given innovation. All too frequently we are much better able to lay out an efficient work station for a new communications system than to convince the project engineer of its obvious merits.

Time is the fourth key element. It takes time for the client to travel the majestic route from awareness of the innovation, to the arousal of interest, to an evaluation of the idea, through an actual trial to arrive finally at adoption or rejection. In terms which are perhaps more comfortable to psychologists, the decision process involves acquisition of knowledge, attitude formation, and change, the rendering of a decision, and data gathering to confirm it.

3. Factors Inhibiting or Accelerating Change

Much has been written on the factors which inhibit (or accelerate) change, and the work is very uneven in quality. It extends from speculation based on experience through empirical studies to controlled experimentation. The contexts studied range from villagers in agrarian societies (16, 12) to retail drug salesmen (28), from Iowa farmers (28) to school administrators (36, 37), from business managers (11, 10) to Defense Department managers (38, 39, 40), and from individuals to organizations. Generalizations from such a diverse literature can

therefore be characterized only as suggestive or, more generously, as the raw materials for the formation of hypotheses for test.

Rogers' views—a general perspective

One widely quoted set of characteristics of innovations that affect the rate of adoption has been offered by Rogers (25):

Relative advantage, that is, the degree to which an innovation is perceived as better than that which it supersedes. Relative advantage can be expressed in such terms as economics, prestige, or convenience to the client.

Compatibility, or the degree to which an innovation is consistent with the existing values and past experiences of the client.

Divisibility, psychologically somewhat similar to buying on the installment plan. It is the degree to which an innovation may be adopted on a limited basis. For training or educational researchers, for example, a divisible innovation could be adopted by part of a school system. In contrast to a stage-by-stage adoption, an all-or-none adoption would not have the characteristic of divisibility.

Complexity, or the degree to which an innovation is relatively difficult to understand and use. The resistance that school teachers manifested some years ago toward the use of motion picture projectors may be a simple example of too great complexity.

Niehoff's analysis of cultural factors

Niehoff, a cultural anthropologist who has analyzed a carefully selected sample of several hundred case histories of cross-cultural change projects in agrarian societies, offers a much more specific listing (12). His analysis of these case studies has yielded a sizable number of hypotheses concerning ways in which characteristics and behaviors of change agents and characteristics of recipients operate to influence the success or failure of innovative efforts. He hypothesizes that transfer of an innovation is easiest, most likely to be successful, if:

- Innovations are selected which tend to be compatible with the cultural patterns of the recipient group. This means that the amount of new behavior which must be accepted, and the amount of old behavior which must be given up, will be minimal.
- Innovations are selected which will meet existing or felt needs of the recipients, preferably those which they have tried to solve through their own efforts.
- Innovations are selected which will provide practical benefits in this world as perceived by the recipients, usually by improving their economic position.
- The strategy of introduction will involve adapting to and working through the local cultural patterns, particularly the pattern of local leadership.

- Channels of communication are established by the change agent which provide an efficient two-way flow of information. Especially vital will be feedback channels from the recipients to the change agent.
- The recipients are involved in the introduction process through full participation. Of most significance will be their contribution of planning, material goods, time, or labor.
- The change agent is flexible in his strategies, altering them to meet unforeseen circumstances.
- The change agent establishes patterns of maintenance among the recipients so that the innovations can be continued when his influence is withdrawn.

Problems in educational change

What is the situation in the field of education? Schmuck somewhat cynically provides a large clue (41):

> "The lack of knowledge utilization is truly social psychological in the sense that it involves both parties simultaneously interlocked in a complex set of ineffective communications."

An equally general and valid observation is offered by Rankin and Blanke (42):

> "Two assumptions re-occur frequently in the literature on educational change: (1) there is a large gap between theory and practice, and (2) special organizations must be created and individuals trained to bridge this gap if educational improvement is to be consistent, effective, and efficient."

Although there is a wide range of opinions as to why this situation obtains, educators and scientists who have studied school systems would probably agree that the following list of factors inhibit diffusion:

1. The diffuseness of the goals of education (41, 43). The goals of education are multiple, especially those having to do with socialization of the students. Rare indeed are good instructional objectives stated in terms of the behavior which is to be attained through the educational process.

2. Lack of an established "engineering function" in the educational system (36, 34). Teacher education programs do not develop the needed skills and knowledge to engineer innovations (37) nor have teachers developed the necessary habits of scholarship. (Mackie and Christensen, 6, believe the same thing is true of Navy instructors.) According to Sieber (43), teaching is a quasi-profession. Hopefully, the Title III centers and the Title IV regional educational laboratories created by the Elementary and Secondary Education Act of 1965 will help to correct this lack (42).

3. Lack of evaluation and feedback (44, 45, 36, 46, 13, 43). This follows quite naturally from a lack of precise goals. How can the effects of an innovation possibly be assessed if it is unclear as to what objective the change is relevant?

4. Attitudes of reticence, suspicion, and fear on the part of educators. The school system is highly vulnerable to a great variety of powerful influences in its environment, such as parents, school boards, and power elites in the community (13, 37, 41, 43). The situation breeds conservatism, and the reticence of the school administrator in advocating change is not surprising. Even his colleagues and staff may resist. Such a state is not conducive to full communication and a creative working relationship designed to produce change. Further, the innovation may not be compatible with existing values and past experience.

5. Management problems and funding problems (47, 36, 48, 37, 43). Both of these factors inhibit the diffusion of innovation. An innovation that is complex and not divisible is much more likely to be costly than one that is simple and divisible. And how does an administrator manage individualized instruction with a quasi-professional staff? Finally, the educational bureaucracy itself is a source of resistance to change.

In surveying the above listing, one might feel very pessimistic about change in education. Yet, according to the architects of planned educational change, the sources of resistance are amenable to study and to modification, but the data clearly suggest that reducing their effects will take time (44).

4. Levels of Change

Chin (49, 50) has drawn a useful distinction among levels of change which could also be viewed as differing definitions of change. He has identified five such levels that appear to occupy different points on a continuum of amount or degree of changing the structure of the client system. This concept of level of change is definitely related to the factors inhibiting innovation, since the scale seems to range from the easiest to the hardest to accomplish.

1. Substitution of one insulated segment for another is the first and simplest form of change. For example, adoption of a new workbook for the same text is likely to have little or no additional system effects.

2. Alteration may involve a minor change but one that can have unforeseen systemic effects. For example, what if the new workbook requires additional laboratory space and equipment with which the teacher is unfamiliar?

3. Sometimes a third level of change occurs, namely *perturbations and variations* in the client system. Temporary oscillations do occur, but they represent variations in the equilibrium of a system.

4. Restructuring is the fourth level of change; it represents fundamental change in the structure of the system. Chin states, "Change of this order is basic social change." The adoption of a new elementary school mathematics curriculum is a familiar example.

5. Finally, and most complex of all, is *value orientation* change. The contemporary wisdom of the observations De Tocqueville made about American society more than 100 years ago suggests how slow is the change in our national character. On a more molecular level the Defense Department has initiated several major value orientation changes concerning the role of the military. One has to do with the provision of a wide variety of technical advice to foreign military services, the cross-cultural functions served by military advisory groups and missions. Other examples, which are even more recent, are found in Project 100,000 and Project Transition, the performance by the services of a social betterment role.

It should be quite obvious, then, that there are very likely to be different principles of change and changing as a function of the level of change involved. Strategies of change must incorporate such considerations.

5. Characteristics of Innovators

In planning change it may be helpful to know something about the characteristics of people who have been innovators. The literature contains descriptions of successful innovators from many different contexts and disciplines. Are there some communalities? If so, they may be helpful in the selection of strategies for effecting change.

a. The cosmopolite versus the localite. First, there is an interesting application on the old adage that "travel broadens." Dissemination seems to be facilitated when the innovators get around, particularly outside their normal environments. Hearn notes that a study by Ross showed that school teachers acquired most of their ideas outside their communities, and that Goldsen and Rales found that "farmers who visited Bangkok innovated at a rate that was significantly greater than their stay-at-home counterparts" (51). Katz reports on two studies in which Midwestern farmers who were early adopters of a hybrid corn made more trips to the big city and to county fairs, and that physicians who were early adopters of a miracle drug attended more out-of-town meetings than did their late adopter counterparts (28). In a study of educational television (ETV) in that citadel of monolithic immobility, the University, Evans indicates that the cosmopolite professor was more likely to consider and use ETV than the localite who rarely left his campus physically and presumably psychologically (48). Anecdotal HumRRO data include several instances in which the U.S. Marine Corps, the Israeli Army, the Canadian Army, and the Norwegian Air Force adopted HumRRO findings before the U.S. Army did.

b. Age. The data are equally good (or bad) on the role of the age of the innovator. For example, Katz' early adopting farmers and physicians tended to be younger (28). Similarly Evans found the younger professors to be more receptive to ETV (48). Educators suspect that it is the younger teacher who is more receptive to innovation.

c. Position in and attitude towards communication networks. Mention has already been made of the multi-dimensional flow of

interactions among research, development, and use activities. Those who move freely among these activities seem to be among the more successful innovators (45, 52). Katz reports innovative farmers and physicians belonged to more formal organizations (farmers) and to be more integrated in informal friendship discussion and advice networks (physicians) (28). Richland's study of a traveling seminar modeled somewhat after the Agricultural Extension Service implies educational innovators are more completely involved in a variety of communication networks (14). This characteristic of innovators is probably related to the cosmopolite factor.

d. Personal or organizational affluence. Individual earlier adopters seem to be more affluent than late adopters (28). (For example, they plant more corn acreage, have more income, or have richer patients.) The two measurable (and hopefully manipulable) attributes studied by Richland in the traveling seminar which appeared to be most frequently associated with educational innovation behavior were high teacher salaries and high school density (14).

A healthy bureaucratic organization (such as a large private company, a Federal agency, a military service, or an R&D laboratory) is, Havelock notes, a *very promising* (his italics) target for the practitioner of planned change (34). One of the rationales for the Elementary and Secondary Education Act was to fund a new complex of educational organizations, a concept at least in part stimulated by the signal success of the Agricultural Extension Service, previously the only government activity of its kind.

e. Personal attributes and characteristics. There are almost no generalizable and reliable data on the personal attributes of successful innovators, but this should surprise no one. The contexts and disciplines studied have varied widely. Even if it existed, it is difficult to see clearly just where such information would lead a change agent. Some of the personality descriptions in the literature suggest the innovator is not the most comfortable person to have around, but then sensitivity training specialists report they have answers to this and other aspects of obstinancy in resisting change (17).

6. Levers to Pull and Buttons to Push in Effecting Change

What kinds of leverage can the change agent bring to bear in terms of his assumptions concerning the nature of the client? This section of "What Do We Know About Change" is an introduction to the consideration of "Strategies for Change." Guba has provided a simple taxonomy that should have considerable pragmatic value (27). He believes that the client may be viewed as having one or more of the following characteristics:

- He is rational. He can be convinced by data, by rational, empirical, logical evidence. The logic of the change proposal will lead him to adopt it. Historically, the military psychologist has leaned very heavily on the use of data. He would rarely advocate change unless he himself was convinced by the evidence. We have implicitly assumed that since we are rational beings, so is the client. Stated

this way, our experience suggests the assumption is a bit naive, or at best only a partial truth.

- He is untrained. Therefore, the client must be taught how to perform in relation to the innovation. The didactic approach requires the use of workshops and in-service training, an approach the military services have used extensively (9, 39, 53).
- He is a psychological entity who can be persuaded. A variety of what Bennis, *et al.*, and Lippitt might term self-actualization devices have been used to attain this laudatory goal of self-actualization (17, 13).
- He is an economic entity who can either be compensated or deprived. The Federal Government provides an excellent example of the use of financial rewards (and punishments) through a multiplicity of programs to assist educational institutions and other segments of the national community to move in desired directions.
- He is a political entity who can be influenced. No one working for Government, or in industry, or in education at any level can fail to have been exposed to examples. Enough said.
- He is a member of a bureaucracy who can be compelled. Pulling this lever, however, does not normally produce a high yield (43).
- He is a member of a profession who can be professionally obligated.

7. Strategies of Change

We come now to the matter which concerns all technologists, namely, how to get things done. What strategies are available for effecting change and how useful are they? The first question is relatively easy to answer by reference to the literature on diffusion research. The second is largely unanswerable because the circumstances of use are so many and data are so scarce. Still, guidelines have heuristic value, and may, subsequent to refinement, be fit subjects for more rigorous test.

General classes of strategies

There are, in the literature, several general conceptualizations of change strategies, plus some specific ones. Chin proposes the following three general categories of approaches (54):

a. Empirical-rational approaches in which "the primary task is seen as one demonstrating through the best-known method the validity of the new mode (the proposed change) in terms of the increased benefits to be gained from adopting it" (54). Examples from the area of applied research can easily be found in the research-development-use cycle of most Government-sponsored research groups. The innovation is

developed, information about it is disseminated, it is adopted frequently after trial, and finally it is installed and institutionalized.

b. Normative-reeducative approaches, a second category, are usually based on some theory of change as applied to individual behavior in small groups, organizations, and communities. Strongly influenced by Freud, Dewey, and Lewin, this family of change strategies concentrates on the pivotal role of values, on a "people," not a "thing," technology. Emphasis is placed on the way the client views himself and his problems. The change problem is not the absence of information; it is one of attitudes and values. Change agency and client, or client system, interact, each learning from the other while they examine the concepts of motivation, morale, and productivity. One example from many might be sensitivity training. The source of influence, the nature of the leverage to change, is "in the psychological processes of identification with the change agency and of internalization of the 'ideal' mode of behaving," supported, of course, by group norms operating in face-to-face contexts (54).

c. Power approaches, Chin's third category, are used to "alter conditions within which other people act by limiting alternatives or by shaping the consequences of their acts or by directly influencing and controlling actions" (54). Compliance and submission are obviously involved in this process for change. The role of key persons or gate-keepers or the power elite is crucial in such command structure-like operations. For example, an order can be given to effect a change, or funds specifically allocated for installation of a given innovation. Supporters of normative-reeducative strategies believe that power approaches are all too frequently counterproductive to harmonious working relationships.

From this categorization and from what has been said about the change process, certain crude guidelines may be deduced. Different strategies are geared for special users. The value systems of the change agent and client, the assumptions the change agent makes about the change process and about the client, and the special circumstances surrounding the client or target system should markedly influence the type of strategy to be adopted.

Some examples of change strategies

Recently Rogers offered some guidelines for accelerating diffusion in a large university which will serve to illustrate the matter of strategy and which may have relevance to our own areas of concern (25). His prescription is as follows:

- Develop and select innovations that have a clear-cut relative advantage. Test their effectiveness under operational conditions before adopting them on a widespread scale.
- Establish an organization within the university to facilitate change and self-renewal in its social structure. (Rogers asks parenthetically, does this mean a Vice-President for Revolution?)

- Establish an organized procedure of informing those at the top accurately and rapidly both of the needs for change at lower levels of the hierarchy and of the actual consequences of attempted innovation. (If carefully followed, might such a practice have prevented or better contained recent college student revolutions?)
- Utilize personnel recruitment, selection, and training policies that encourage development of a staff oriented to innovative approaches.
- Utilize informal, interpersonal channels of communication to diffuse innovations.

At the 1968 meeting of the American Educational Research Association, Flanagan offered a most sensible outline of an approach for the educational administrator faced with the problem of choosing from among the various educational innovations which might be tried out in his system (46). His paper represents a look at change from the other side of the fence, for in it he provides the administrator with systematic, general advice on what to consider in selecting, installing, evaluating, extending, and improving educational innovation.

A "best" strategy?

The utility of a change strategy is a matter for empirical test. The very nature of technology, let alone the technology of a soft subject matter such as change, is such that it would be surprising to find simple, hard and fast, uniformly proven principles. But we have, nonetheless, a rich variety of things to consider and a structure of sorts which should serve to make our sometimes implicit assumptions much more explicit when settling on a strategy for change.

Two Paradigms of the Process of Effecting Change

One way to present a summation of what we know about change and to indicate how we may become better students and practitioners of the process is to attempt a formulation of a pre-model. While this approach contains elements of the tragic and the futile, it has contemporary appeal. I shall proceed along these lines, mindful of, but unswayed by, O'Connell's injunction (10): "Obviously, it is too early for a general theory of organizational change. The social scientists involved can have faced only a narrow range of situations in application of their somewhat restricted techniques." He goes on to ask if we can answer such specific questions as:

- Is there a best way to manage organizational change in complex business enterprises?
- Is there a trustworthy formula for planning and controlling shifts in the programmed sets of behavior patterns that make up organizations?

Well, I can answer such questions: The answer is "No."

1. Criteria for Evaluating Change Models

Before proceeding, a statement of some of the criteria by which a model might be evaluated is pertinent. My formulation of these criteria is heavily influenced by Chin (50). Such a list of criteria might include, but not be limited, to the following:

- Provision for mutual recognition of change agent and client system roles. Does it take into account the values and perceptions of each?
- Provision of the means for affecting the direction, tempo, and quality of the process of change for both the change agent and the client system. These handles or levers must be alterable or manipulable.
- Consideration of the cost of usage. In the modern parlance of the Federal Government, is the model cost/effective?
- Provision of a reliable basis of diagnosing the strengths and the weaknesses of the client system.
- Definition of the period of time required for a continuing relationship of the change agent with special reference to the process of client reaction and anxiety, the obstacles discovered and the new supports required (e.g., demonstrations, training programs, funding for maintenance of the changed mode).
- Assurance that the model can be communicated realistically to the client system, without distortion and without destroying its basis of effectiveness.
- Capability to assume its own appropriateness for different client systems. Does the model provide its own criteria for assessing when it is applicable and when it is not?
- Usefulness to a variety of change agents of different philosophical persuasions and with different backgrounds of training and experience.
- Provision of means by which students of change can detect gaps in theory and practice.

2. The Many Types of Change Models

Most serious students of change have come to the same conclusion as has O'Connell concerning models. It is premature to do more than wish for a general model, let alone a general theory of change and changing. Accordingly, researchers have developed a variety of subsystem models, each of which deals with some aspect of the change process or with some specific setting. Quite understandably, they vary widely in comprehensiveness, complexity, and elegance.

There are the beginnings of models (pre-models) for: the process involved in applied R&D which includes elements of the change process (6, 55), for curriculum or other change at all educational levels (48, 13, 25), for modifying and improving business and industrial

practices (17, 11, 10), for change in other cultures (7, 12), for effecting change in community settings (56), for the roles of the advocate of innovation (19), for the role of the potential adopter or receiver of the innovation (46, 57), for the role of the linker (he who travels back and forth over the lonely road between research and practice) (45, 34, 58), for information retrieval systems to facilitate change (36, 59), and for the collaborative process involving the system and the change agent (17, 48, 13, 22, 43).

There are, of course, several different general classes of models. Chin, who is one of the most persistent students of modelling the change process, offers these distinctions among basic organizational models (50).

a. Systems and component models. A system model, he states, "assumes a relatively leak-tight boundary for the elements under consideration, a close degree of interrelationship and interdependency of these elements, an arrangement whereby the elements are in some sort of balance or equilibrium" (50).

b. Organic system model. The organic system model is like the system component model, but is more open, that is, there is more interchange with the surrounding environment.

c. Developmental models imply a direction of movement and are not bound by time as are system models. The stages or phases which exist at one point in time are to be replaced by other stages at a later point in time. Chin cites as examples genetic growth and the models some economists use in characterizing economic growth in developing nations (50).

d. Intersystem models, the fourth class, "use properties of two organic systems in direct and purposive contact with each other. One needs to specify the nature of the relationship, such as the connections, attractions and rejections that create a relationship between the two systems" (50). Because it gives specific attention to the change agent's role, (whether the change agent be an individual or an organization), intersystem models tend to be favored.

Intersystem models as applied to the process of effecting change might be divided into two rough categories, one which focuses primarily on person-to-person relationships and one whose emphasis is more strongly placed on the continuing relationship between two existing complex systems (the client system and the R&D change agent system). For many of us in Division 19, an inter-organizational model may have more relevance than a more interpersonal model, but both may be pertinent to the given situation in which one or more gatekeepers must agree to change before an organization adopts an innovation. So, major elements of an interpersonal model must be included in an inter-organizational model.

3. The Interpersonal Paradigm

Perhaps the most satisfying interpersonal model is an adaptation of a more general model by Rogers (25). It is satisfying because it incorporates and relates so much of that which we think we

know about the adoption of an innovation. This paradigm is, of course, a pre-model, not a model in any rigorous sense. Rogers divided the process into three stages: antecedents, process, and results. He relates information flow and indicates decision points among the three stages. The somewhat modified version of his representation is contained in Figure 1.

As is apparent, this is a communicable pre-model which moves across time and which provides for an analysis of the characteristics of the client, change agent, and the innovation. However, it does not clearly indicate how the process of change can be altered, nor does it address the question of how successfully the pre-model can be used by a variety of change agents. Further, the nature of the collaborative process is not clear, nor does it accurately specify gaps in our knowledge of change. Notwithstanding, however, such a pre-model should have utility, for it can provide a partial diagnostic framework for the practitioner.

4. The Inter-organizational Paradigm

A pre-model for inter-organizational relationships involved in the research through development to use cycle has been implicitly or explicitly considered by a variety of educators and psychologists (34, 6, 37, 58, 55). (Prominent among them are a distinguished group of military psychologists including Crawford, Mackie, and Vallance.) These formulations are limited more or less to the gross block-diagram level, and they are less concerned with the actual adoption and collaborative processes than are Rogers (25), Lippitt (13), and Chin (54). The Mackie and Christensen conceptualization, however, sharply highlights system deficiencies in the collation and interpretation and translation roles (6). Havelock calls this the "linking" function which he has treated in illuminating detail (34).

This inter-organizational pre-model could be divided into the three elements Rogers uses (antecedents, process, and results—see Figure 1), but I have chosen not to do so. Instead, the major elements follow more closely the concept of research through development to use—a concept with which military psychologists are more familiar. It is not as important for the inter-individual model that information be generated *de novo*, although information is a critically important ingredient in both paradigms. An applied R&D organization, however, involves additional roles because it incorporates research functions as well as linking roles (34, 38, 40, 58). There also are linking organizations specifically created to move back and forth between research and practice. (For example, in education the Title III and Title IV laboratories and the Training Analysis and Development Divisions established throughout the schools of the USAF's Training Command in the late 1940s and 1950s to serve as linkers between the Human Resources Research Center/Personnel and Training Research Center and training operations.)

The inter-organization paradigm is an example of an inter-system model. It contains four major phases: requirements for R&D, the conduct of R&D, the decision process, and use or rejection of the

Paradigm for Adoption of an Innovation by an Individual (after Rogers)

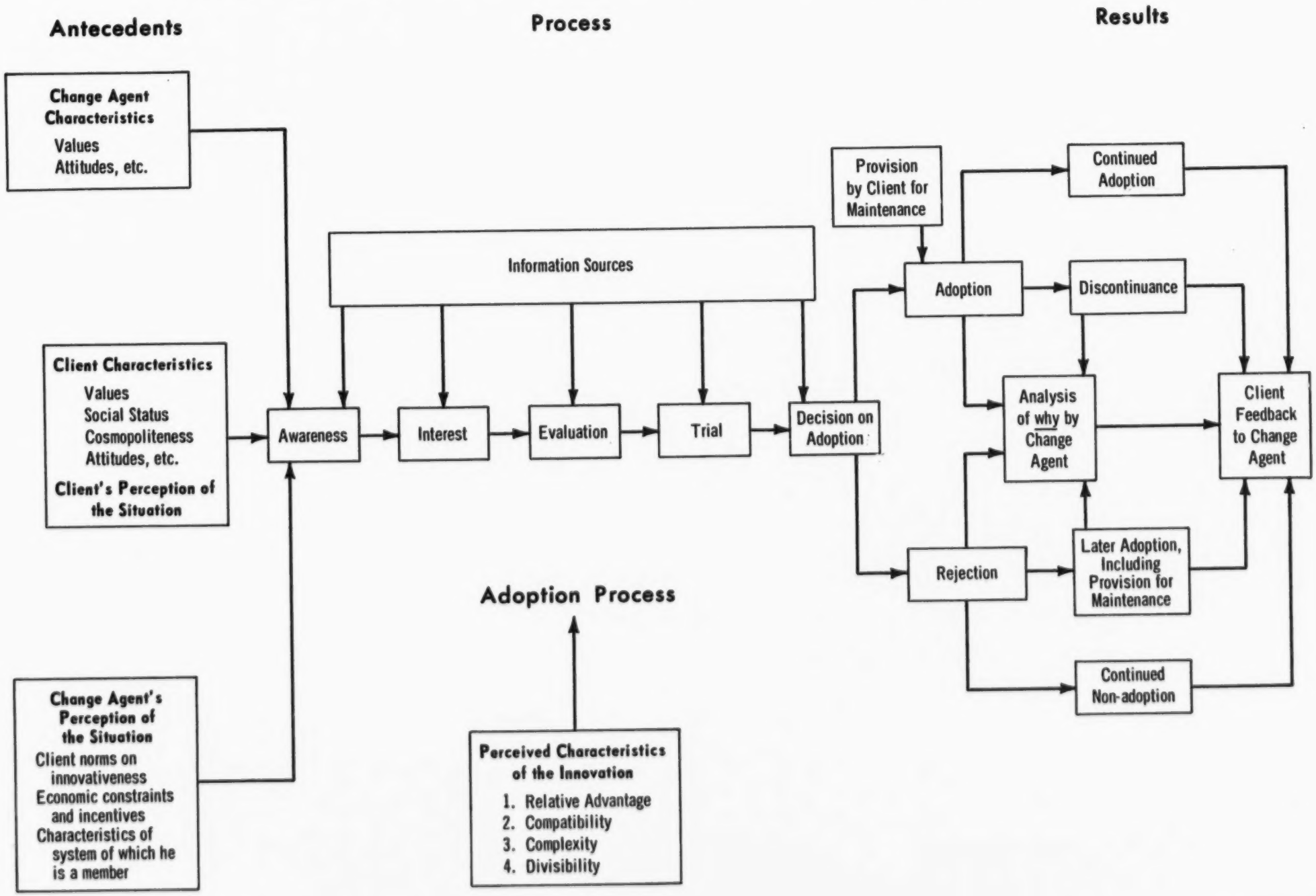

Figure 1

innovation. It is based on the assumption that extensive, meaningful documentation is required, dissemination of which may serve individuals and agencies other than the target system. It assumes there is minimal participation by a third agent, the linker, the R&D agency performing this role. While it also assumes a continuing client-R&D agency relationship, most elements of this pre-model appear applicable to a shorter client-R&D agency relationship. Finally, it requires some continuity of personnel in the R&D agency, since movement of scientists back and forth from stage to stage is also assumed. In short, it is not a general model.

Since the stages in this pre-model are reasonably straightforward, I will refer briefly to Figure 2 where it is depicted schematically. How does this conceptualization measure up to the criteria for a change model already mentioned? At a general level it provides for the role recognition of the client system and the R&D agency. It requires attention to characteristics (weaknesses and strengths) of both the client and R&D systems. It indicates over time the nature of the continuing relationship, the points of mutual interaction, and what economists call the take-off period. The client system should understand it, thereby facilitating, not destroying, its effectiveness.

This pre-model falls short, however, on the degree of specificity of almost all these points. It does not provide its own criteria for assessing its effectiveness, other than by means of the client system's desire to continue the relationship. It does not indicate how generally it can be used by different change agents. It does not provide detail on ways and means by which the nature of the process of change can be altered. Also, it merely suggests gaps in our knowledge.

Overall, the inter-organizational paradigm does have heuristic value. Why do I assert this? Because, basically it is an elaboration of the model which HumRRO has evolved over a period of working with the Army for 17 years. This fact represents a kind of validation, however gross.

Summary

In this paper I have attempted to indicate the importance of improving our understanding of the process of change and to summarize some of the relevant literature on the diffusion of innovations drawing from studies in rural sociology, cultural anthropology, industrial settings, education, and psychology. Finally, I have briefly outlined two paradigms, or pre-models of change, which may have utility to practitioners as well as suggesting to scholars the large gaps in our knowledge that must be filled before a theory of change can be formulated. The urgency of this need for improved practice and better theory is great.

If you will, think of yourselves as the singers mourning the death of the poor titwillow in the well-known lyric I have paraphrased for your convenience:

> "If you remain callous and obdurate, I, shall perish as he did, and you will know why. Though I probably shall not exclaim as I die, 'better theory, better practice, better theory, better practice . . .' "

Paradigm for Inter-organizational Research and Development—Decision—Use Cycle

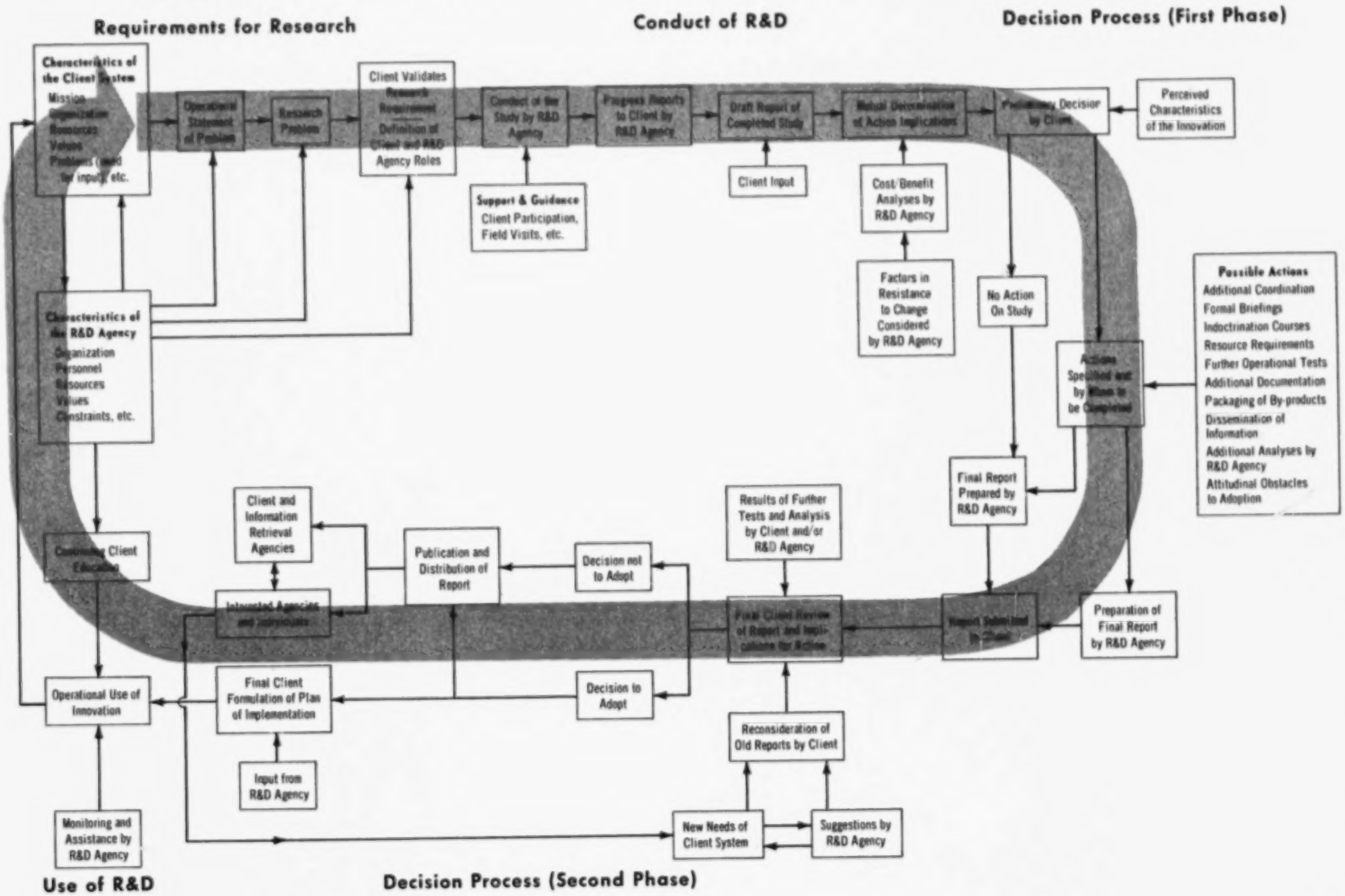
Requirements for Research
Conduct of R&D
Decision Process (First Phase)
Characteristics of the Client System
Mission
Organization
Resources
Values
Problems (need for input), etc.
Operational Statement of Problem
Research Problem
Client Validates Research Requirement
Definition of Client and R&D Agency Roles
Conduct of the Study by R&D Agency
Support & Guidance
Client Participation, Field Visits, etc.
Progress Reports to Client by R&D Agency
Draft Report of Completed Study
Client Input
Mutual Determination of Action Implications
Cost/Benefit Analyses by R&D Agency
Factors in Resistance to Change Considered by R&D Agency
Preliminary Decision by Client
Perceived Characteristics of the Innovation
No Action On Study
Possible Actions
Additional Coordination
Formal Briefings
Indoctrination Courses
Resource Requirements
Further Operational Tests
Additional Documentation
Packaging of By-products
Dissemination of Information
Additional Analyses by R&D Agency
Attitudinal Obstacles to Adoption
Actions Specified and by Whom to be Completed
Final Report Prepared by R&D Agency
Characteristics of the R&D Agency
Organization
Personnel
Resources
Values
Constraints, etc.
Client and Information Retrieval Agencies
Publication and Distribution of Report
Decision not to Adopt
Results of Further Tests and Analysis by Client and/or R&D Agency
Interested Agencies and Individuals
Final Client Review of Report and Implications for Action
Report Submitted to Client
Preparation of Final Report by R&D Agency
Operational Use of Innovation
Final Client Formulation of Plan of Implementation
Decision to Adopt
Reconsideration of Old Reports by Client
Input from R&D Agency
Monitoring and Assistance by R&D Agency
New Needs of Client System
Suggestions by R&D Agency
Use of R&D
Decision Process (Second Phase)

Figure 2

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13. ABSTRACT

In this paper the author indicates the importance of improving our understanding of the process of change and summarizes some of the relevant literature on the diffusion of innovations drawing from studies in rural sociology, cultural anthropology, industry, education, and psychology. There also is a brief outline of two paradigms or pre-models of change which may have utility to practitioners as well as suggesting to scholars the large gaps in the knowledge that must be filled before a theory of change can be formulated.

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